Geological hazard assessment of volcanic islands: Insights from seafloor geomorphology and turbidites in sediment cores, central Azores Islands

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EGU

Outstanding Student & PhD candidate Presentation contest

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SCAN ME

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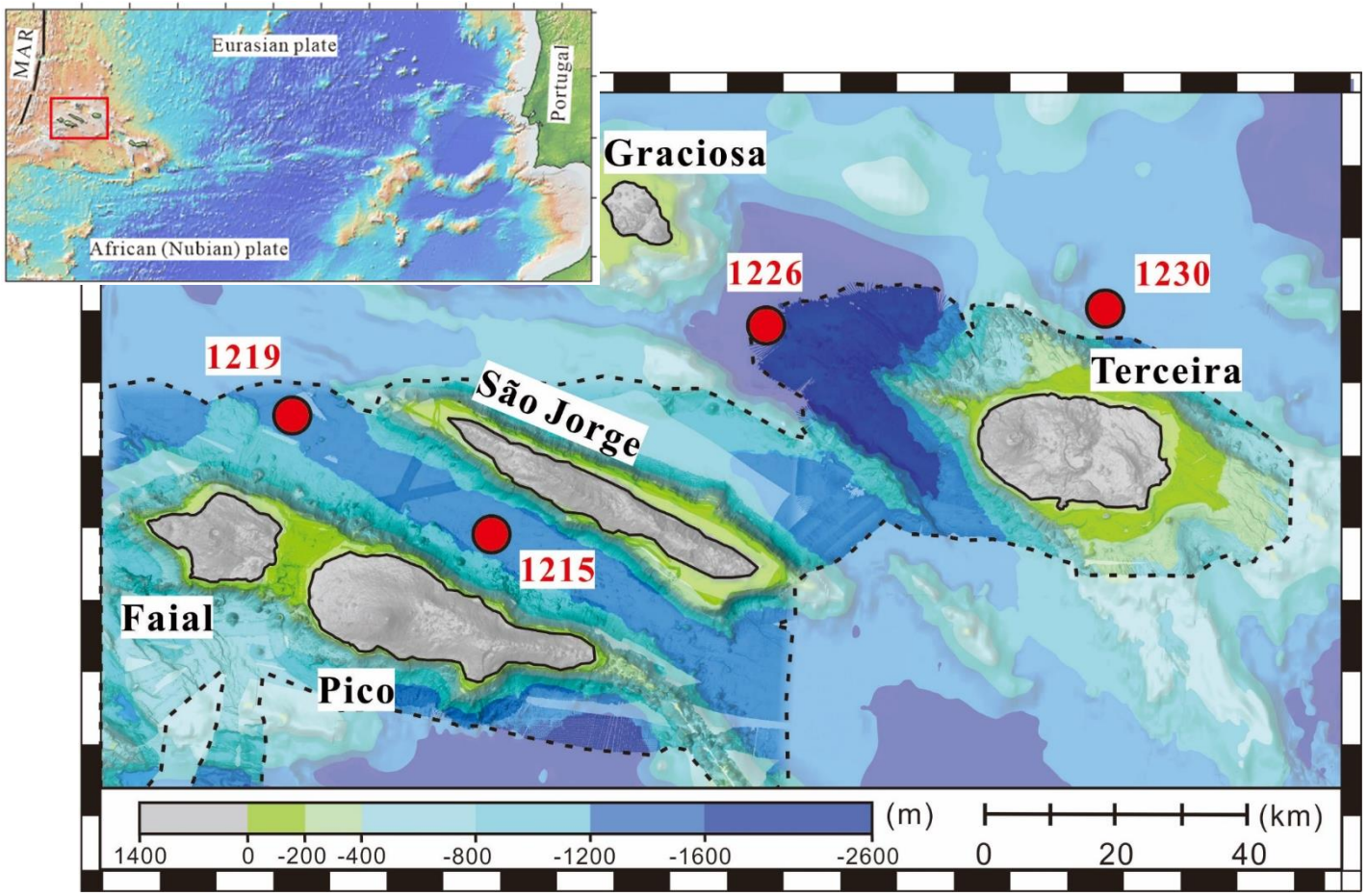
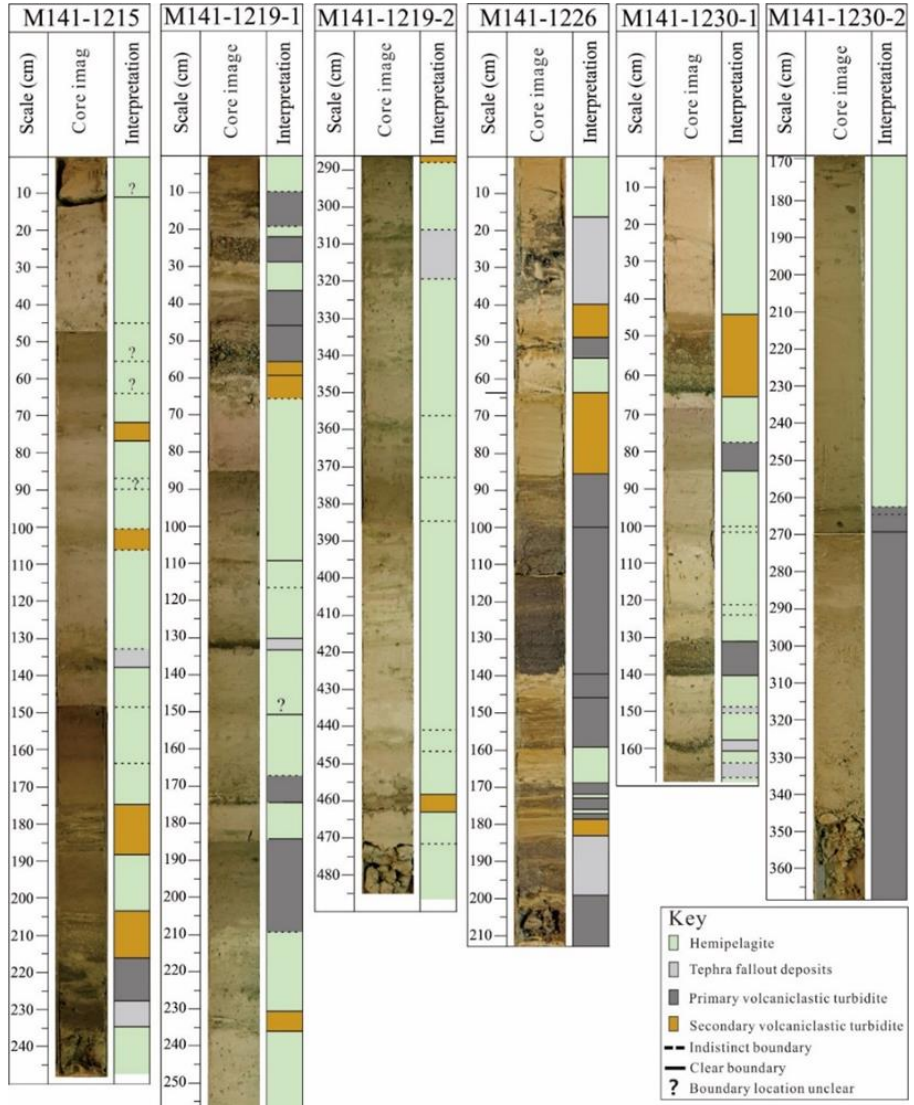
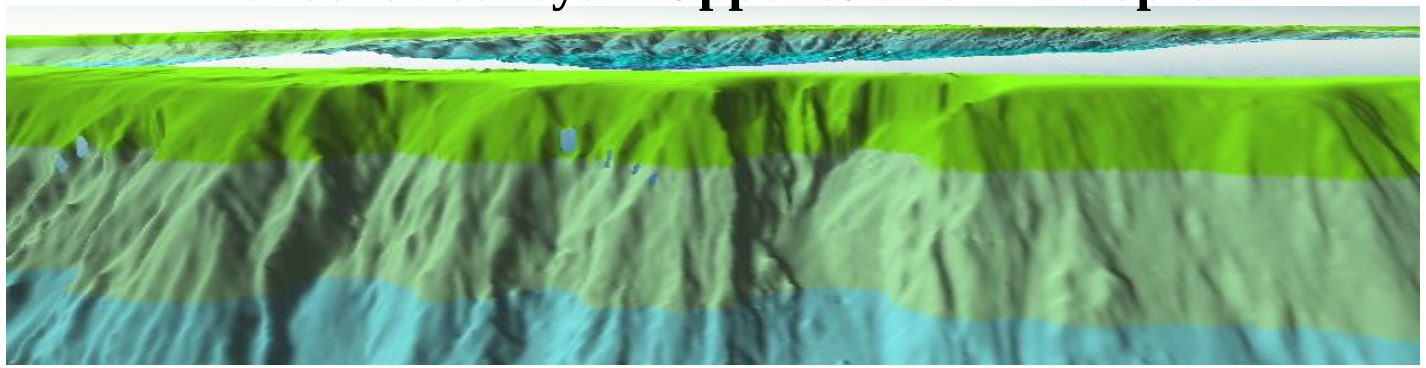


Volcaniclastic-rich sediments in cores



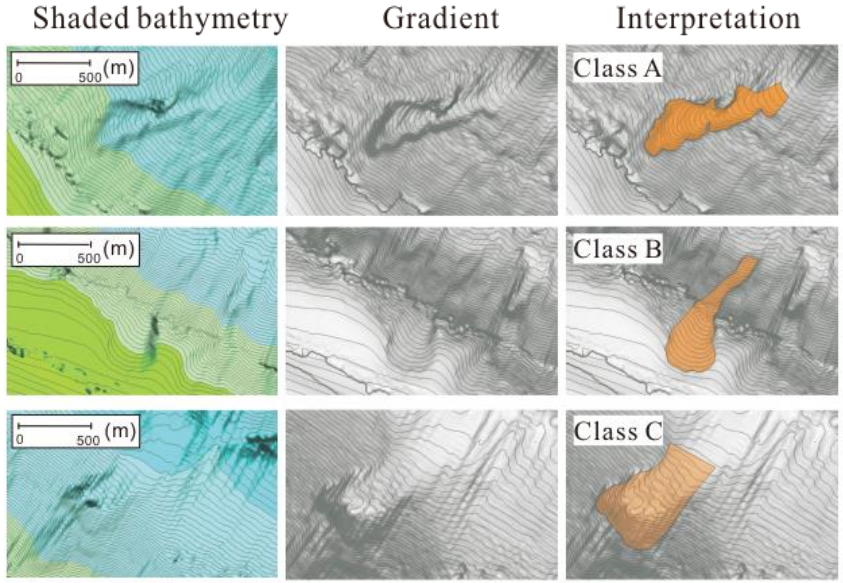
Landslide valleys in upper submarine slopes



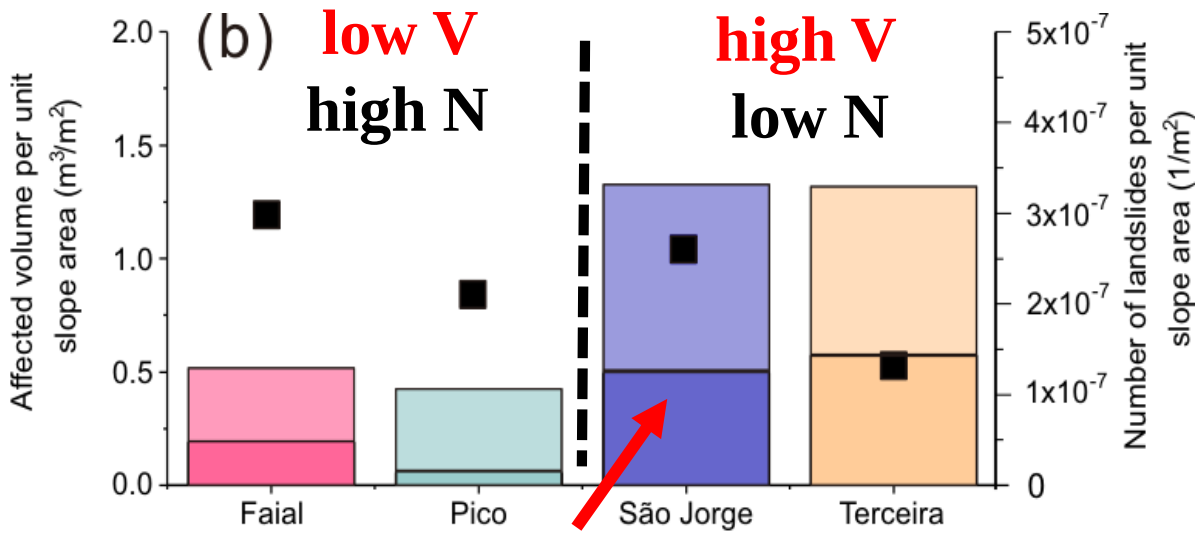
Submarine landslides and hazard assessments

Chang et al. 2021a, *G3*

affected volume & number
unit slope area



>1200 landslide valleys. 10^4-10^6 m^3 dominant

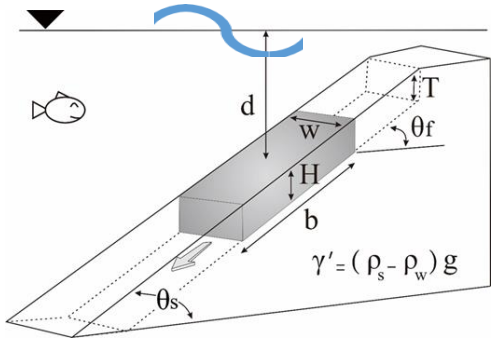


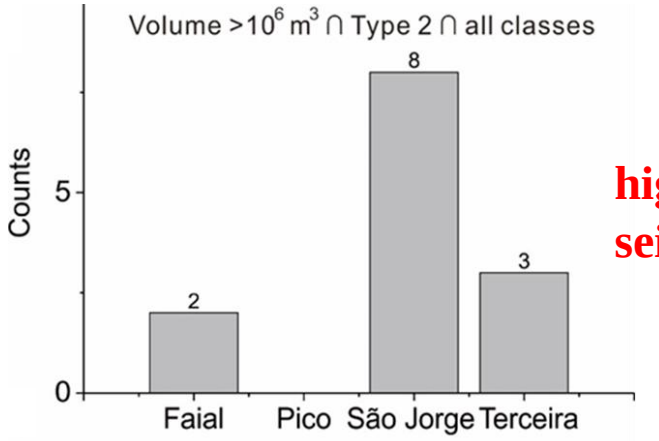
Bold colour: most recognizable and from single failures

High abundance but small volume landslides around Faial and Pico

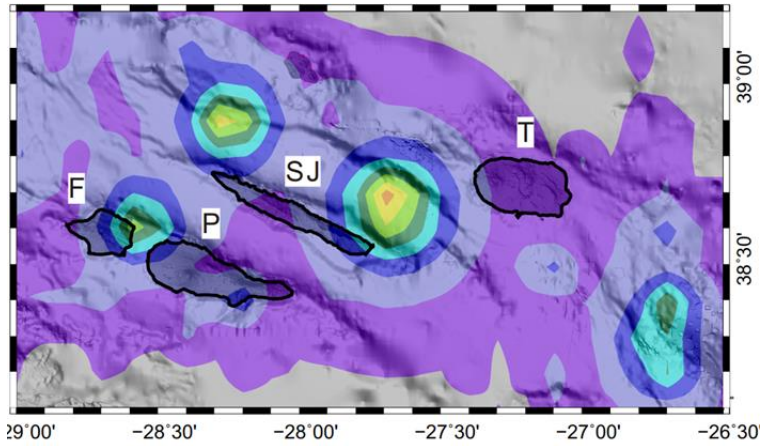
uncorrelated

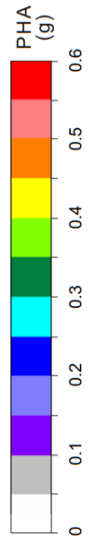
Tsunami wave height estimates





higher long-term seismicity?





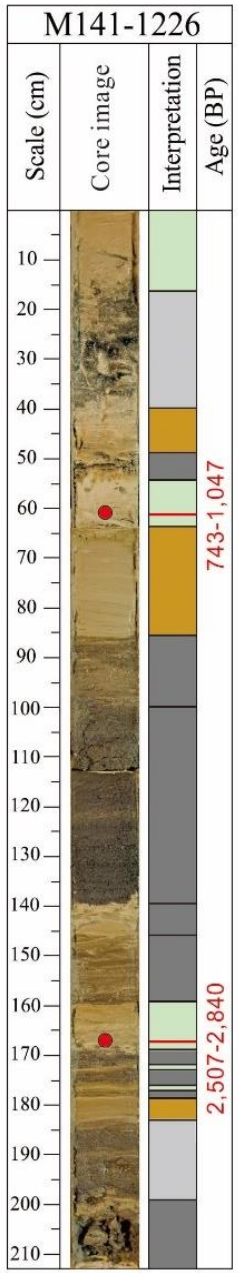
Max. h>7m

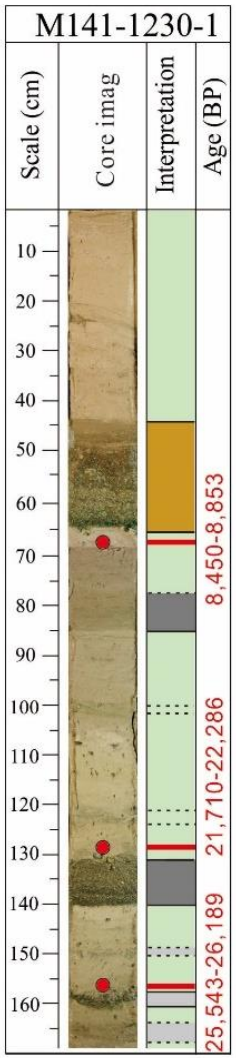
13 predicted with h>1 m at source.

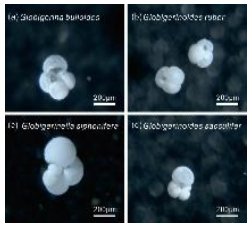
Ground accelerations predicted from instrumental seismicity

Discriminating volcaniclastic beds in sediment cores

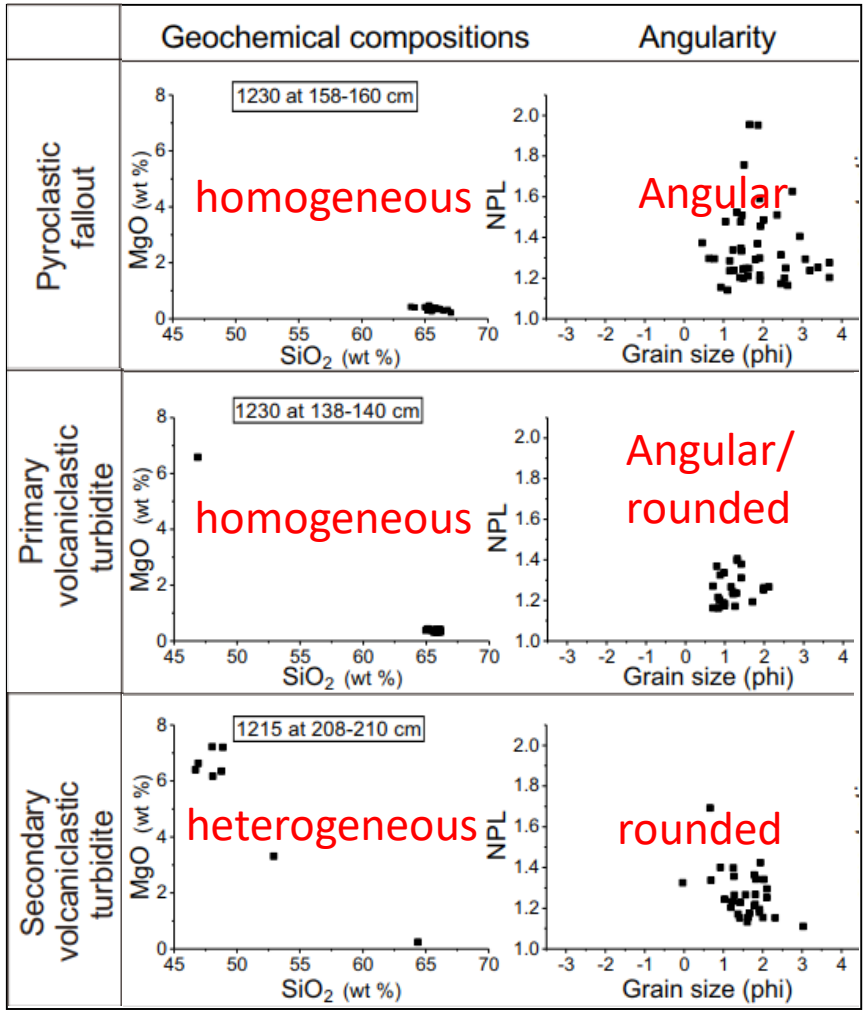
Chang et al. 2021b *Geol. Soc. London Spec. Publ.*



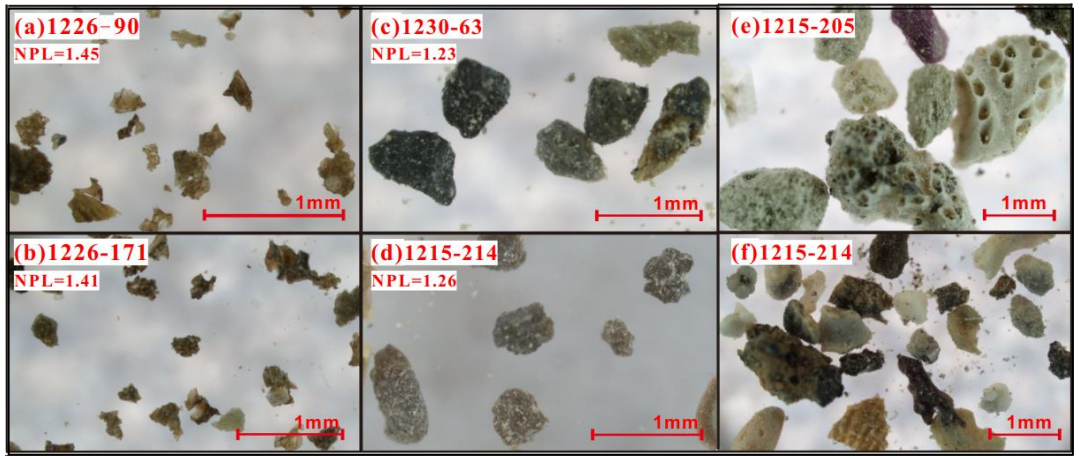




volcanic glass geochemistry and grain shape analysis



sediment composition



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- Pyroclastic Fallout — 9
- Primary volcaniclastic turbidite (PVT) — 20
- Secondary volcaniclastic turbidite (SVT) — 13

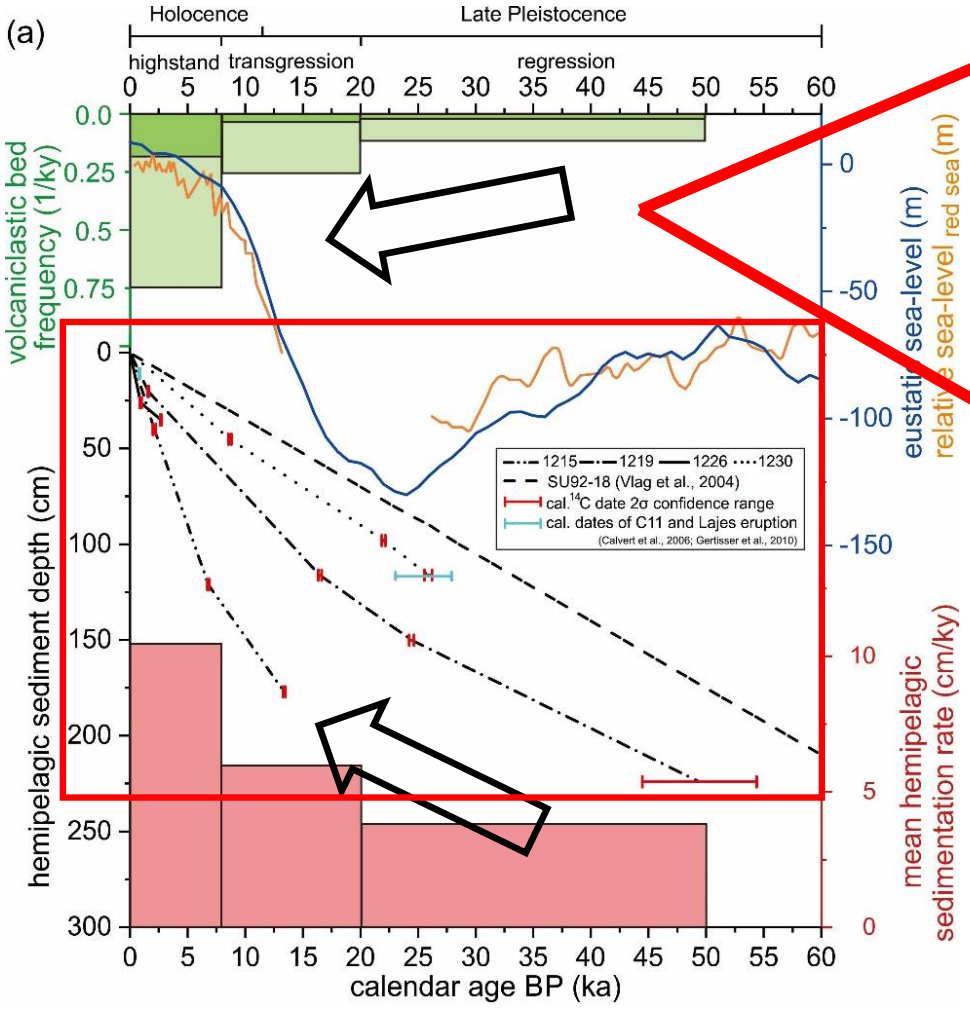
~2/3 of eruption-fed

~1/3 of potential landslide origin

Age-depth modellings

Chang et al. (in prep.)

Total event frequencies (landslide+eruption) were higher in the Holocene.

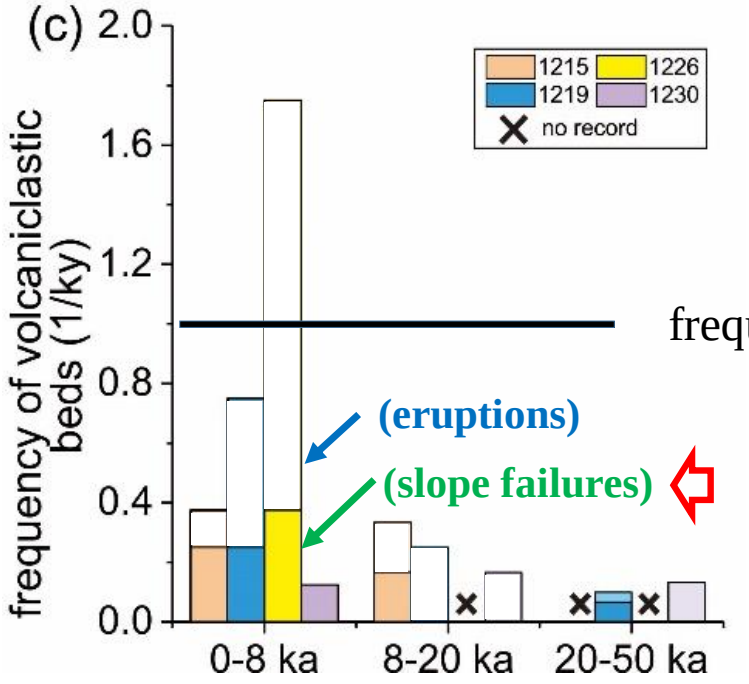


slope failures

similar pattern

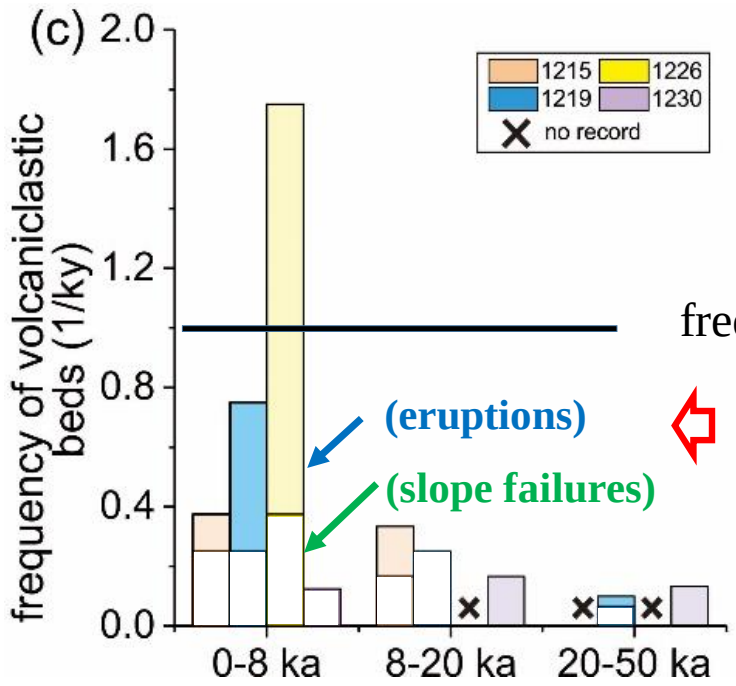
eruptions

some variances



frequency = 1/ky

periods >1 ky



frequency = 1/ky

periods >1 ky

Total and individual sedimentation rates were both higher in the Holocene.

Takeaway messages

SCAN ME

- **1. >1200 valleys were identified, of volume 10^2-10^8 m^3 (small compared with Canary giant landslides > 10^{11} m^3**
- **2. Smaller and many more landslides around Pico and Faial may be a result of more frequent earthquakes in these two islands**
- **3. Volcaniclastic turbidites have 1/3 landslide and 2/3 eruption origin**
- **4. Return periods of large eruptions and landslides are >1ky**

Q&A